

## MULTI-CHANNEL OPTICAL EQUALIZER FOR INTERSYMBOL INTERFERENCE MITIGATION

### Abstract

An improved multi-channel optical equalizer method and apparatus for intersymbol interference mitigation compensates for single- or multi- wavelength channels simultaneously and requires few adjustable parameters. The optical equalizer can also compensate for overshoots and signal transition degradations of a semiconductor optical amplifier. The equalizer unit has only two control signals, one to control signal magnitude and one to control signal phase, yet it can still compensate many wavelength channels simultaneously. The equalizer includes a coupler with a controllable coupling ratio for splitting the light into two portions and a controllable interferometer means having two arms, one arm having an additional delay which is equal to an integer multiple of  $1/\Delta f$ , where  $\Delta f$  is the channel spacing between adjacent wavelengths utilized in the optical system. The controllable interferometer unit also has a controllable delay in a first or second arm for adjusting the relative phase of the light passing therethrough. A coupler combines the two signal portions from the first and second arms to form the equalized output signal. In a second embodiment, the equalizer includes two equalizer units connected in series to compensate for both leading and lagging intersymbol interference.